Remarks:

Reconsideration of the application is requested.

Claims 1-20 remain in the application. Claims 1, 11, and 12 have been amended.

In the second paragraph on page 2 of the above-identified Office action, claims 12-20 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, the Examiner has stated that: "Clams 12-20 disclose semiconductor regions to surround the semiconductor zones at a respective distance 'except for a channel'. It is unclear if the semiconductor region does not surround the channel or if the channel does not surround the semiconductor region at the respective distance."

The Examiner's comments have been noted and claim 12 has been amended to recite "said semiconductor regions surrounding said semiconductor zone at a respective distance except for a channel formed of said semiconductor layer interrupting each respective one of said semiconductor regions" (additions are underlined).

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, Counsel would appreciate a telephone call during which the matter may be resolved. The above-noted change to claim 12 is provided solely for the purpose of satisfying formal requirements or for cosmetic reasons. The change is neither provided for overcoming the prior art nor does it narrow the scope of claim 12 for any reason related to the statutory requirements for a patent.

In the last paragraph on page 2 of the Office action, claims 1-3, 5-7, 10, 12-14, 16-17, and 20 have been rejected as being obvious over *Nishizawa et al.* (US 5,175,598) in view of *Stengl* (US 5,113,237) under 35 U.S.C. § 103.

In the first paragraph on page 4 of the Office action, claims 4 and 15 have been rejected as being obvious over *Nishizawa et al.* and *Stengl* in view of *Siergiej et al.* (US 5,945,701) under 35 U.S.C. § 103.

In the third paragraph on page 4 of the Office action, claims 8, 9, 18, and 19 have been rejected as being obvious over *Nishizawa et al.* and *Stengl* in view of *Notley* (US 5,324,971) under 35 U.S.C. § 103.

In the second paragraph on page 5 of the Office action, claim 11 has been rejected as being obvious over *Nishizawa et al.* in view of *Stengl* under 35 U.S.C. § 103.

The rejection has been noted and claims 1, 11, and 12 have been amended to recite "said channels electrically connecting parts of said semiconductor body separated by said semiconductor regions" in an effort to even more clearly define the invention of the instant application. Support for the changes can be found on page 9, lines 20-25, of the specification.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 12 (similarly claims 1 and 11) as amended calls for, inter alia:

> each one of said semiconductor regions ***being interrupted*** at at least one location ***by channels*** formed by said semiconductor body, said ***channels electrically connecting parts of said semiconductor body*** separated by said semiconductor regions

The Examiner stated on page 4, lines 15-17, of the Office action that "Nishizawa discloses all of the limitations except for the semiconductor body having a doping concentration

greater than 5 x 10^{13} charge carrier cm^{-3}." The Examiner then applies *Stengl* for disclosing a doping concentration greater than 5 x 10^{13} charge carrier cm^{-3}.

However, *Nishizawa et al.* also do not disclose or suggest at least one very important feature of the recited invention. *Nishizawa et al.* do not disclose or suggest a semiconductor region of a second conductivity type ***surrounding*** the semiconductor zone ***except*** for a channel formed of a semiconductor of a first conductivity type which also electrically connects parts of the semiconductor body otherwise being electrically separated from each other by the semiconductor regions. *Nishizawa et al.* state in col. 2, lines 55-59, "there is disposed a ... p+ type semiconductor region 3 ... so as to surround a plurality of individual portions of the n- type semiconductor layer 4." No "channel" of a ***different*** conductivity type than the surrounding semiconductor region is present in *Nishizawa et al.*. This can also be clearly seen in Fig. 2 of *Nishizawa et al.*.

The inventive concept of the invention of the instant application is to avoid large reverse currents despite high applied voltages by using a semiconductor component having a semiconductor layer with a doping concentration greater than 5 x 10^{13} charge carriers cm^{-3} in combination with a semiconductor region of a second conductivity type ***surrounding*** the

semiconductor zone ***except*** for a channel formed of a semiconductor of a first conductivity type. The applied references neither suggest nor contain the relevant teaching which would suggest such a semiconductor component. Therefore, the invention as recited in claims 1, 11, and 12 of the instant application is also believed not to be obvious over the cited references.

It is accordingly believed to be clear that *Nishizawa et al.* in view of *Stengl* do not suggest the features of claims 1, 11, and 12. Claims 1, 11, and 12 are, therefore, believed to be patentable over the art and since claims 2-10 and 13-20 are ultimately dependent on either of claims 1 and 12, they are believed to be patentable as well.

Considering the deficiencies of the primary reference *Nishizawa et al.*, it is believed not to be necessary at this stage to address in more detail the secondary references *Stengl* and *Notley*, and whether or not there is sufficient suggestion or motivation with a reasonable expectation of success for modifying or combining the references as required by MPEP § 2143.

In view of the foregoing, reconsideration and allowance of claims 1-20 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, the Examiner is respectfully requested to telephone counsel so that, if possible, patentable language can be worked out. In the alternative, the entry of the amendment is requested as it is believed to place the application in better condition for appeal, without requiring extension of the field of search.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

MARKUS NOLFF
REG. NO. 37,006

For Applicants

MN:cgm

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Lerner and Greenberg, P.A.
Post Office Box 2480
Hollywood, FL 33022-2480
Tel: (954) 925-1100
Fax: (954) 925-1101

Applic. No. : 09/816,927

Version with markings to show changes made:

Claim 1 (amended). A semiconductor component, comprising:

a semiconductor body of a first conductivity type, said semiconductor body having a first doping concentration greater than 5×10^{13} charge carriers cm^{-3} and having a first surface and a second surface, said first and second surfaces being provided opposite from one another;

at least a first electrode disposed on said first surface and at least a second electrode disposed on said second surface;

a semiconductor zone of a second conductivity type opposite to the first conductivity type;

a pn-junction formed between said semiconductor zone of the second conductivity type and said semiconductor body;

at least one of said first and second electrodes being in contact with said semiconductor zone of the second conductivity type;

semiconductor regions of the second conductivity type provided in said semiconductor body;

said semiconductor regions being disposed at a respective distance from said semiconductor zone of the second

conductivity type such that said semiconductor regions surround said semiconductor zone of the second conductivity type in a well-shape;

each one of said semiconductor regions being interrupted at at least one location by channels formed by said semiconductor body, said channels electrically connecting parts of said semiconductor body separated by said semiconductor regions; and

said semiconductor regions of the second conductivity type having a second doping concentration such that said semiconductor regions are not completely depleted of charge carriers in case of a reverse-biasing of said pn-junction.

Claim 11 (twice amended). A semiconductor configuration, comprising:

a semiconductor component selected from the group consisting of a diode, a MOS transistor and a thyristor;

said semiconductor component including:

a semiconductor body of a first conductivity type, said semiconductor body having a first doping concentration greater than 5×10^{13} charge carriers cm^{-3} and having a first surface and a second surface, said first and second surfaces being provided opposite from one another;

at least a first electrode disposed on said first surface and at least a second electrode disposed on said second surface;

a semiconductor zone of a second conductivity type opposite to the first conductivity type;

a pn-junction formed between said semiconductor zone of the second conductivity type and said semiconductor body;

at least one of said first and second electrodes being in contact with said semiconductor zone of the second conductivity type;

semiconductor regions of the second conductivity type provided in said semiconductor body;

said semiconductor regions being disposed at a respective distance from said semiconductor zone of the second conductivity type such that said semiconductor regions surround said semiconductor zone of the second conductivity type in a well-shape;

each one of said semiconductor regions being interrupted at at least one location by channels formed by said semiconductor body, said channels electrically connecting parts of said semiconductor body separated by said semiconductor regions; and

said semiconductor regions of the second conductivity type having a second doping concentration such that said semiconductor regions are not completely depleted of charge carriers in case of a reverse-biasing of said pn-junction.

Claim 12 (amended). A semiconductor component, comprising:

a semiconductor body having a semiconductor layer of a first conductivity type with a doping concentration greater than 5 x 10^{13} charge carriers cm^{-3};

a semiconductor zone of a second conductivity type opposite to said semiconductor layer of said first conductivity type;

a pn-junction formed between said semiconductor zone and said semiconductor layer; and

semiconductor regions of the second conductivity type in said semiconductor body, said semiconductor regions surrounding said semiconductor zone at a respective distance except for a channel formed of said semiconductor layer <u>interrupting each respective one of said semiconductor regions and electrically connecting parts of said semiconductor body separated by said semiconductor regions</u>, said semiconductor regions having a doping concentration preventing completely depleted of charge carriers upon a reverse-biasing of said pn-junction.